

## Paris Meeting

Many of you were present at the IXO Science Meeting in Paris, which was a great success despite travel problems associated with the volcanic eruption in Iceland. We are most grateful to all participants for their efforts to attend the meeting, and to Didier Barret and his team for the excellent facilities and hospitality. Presentations are now online at: <http://ixomeeting.cesr.fr>

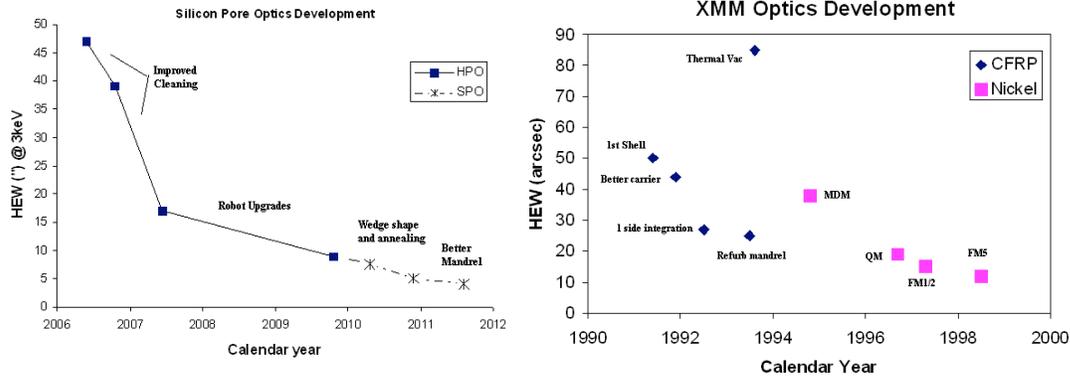
## IXO Study Status

IXO has now been the subject of 4 independent system studies: in the ESA Concurrent Design Facility (CDF), the NASA Mission Design Lab (MDL) and two ongoing industrial studies by Thales Alenia Space and Astrium UK, commissioned by ESA as part of the Cosmic Vision Phase A. All indicate that the mission is feasible with no “show stoppers” identified. The NASA design meets the science requirements, with adequate margins. The ESA-sponsored industry studies are being carried out to meet the very stringent margins that were mandated for the selection of L-class missions. These studies will be completed by July 2010, and will increase further the mission’s level of definition.

To ensure adequate mass margins, the industrial studies are pursuing a design for the telescope with fewer outer shells compared to the CDF study. In the new design, the achievable effective area (particularly at 1 keV) is reduced, but with large mass savings. The final effective area will be known at the end of the industrial studies, but initial estimates suggest that the modified telescope design should still deliver close to  $3\text{m}^2$ . None the less, to ensure a robust mission concept for the ESA review process, the SCG has decided to lower the mirror effective area requirement at 1.25 keV to  $2.5\text{m}^2$ , with a goal of  $3\text{m}^2$  – a philosophy that is consistent with the main downscope option presented to the Decadal Survey. Ongoing simulations and refinements to the observing plan have shown that the driving science objectives of the mission can be accommodated with this effective area, mostly via increased observing times for deep Universe surveys. We are also investigating the possibility of increasing the field of view of the Wide Field Imager, to deliver more efficient surveys and mapping of extended sources. New response matrices are expected to be released shortly which reflect both the current best estimate for the baseline Silicon Pore Optics (SPO) design, as well as the minimum mirror area requirement of  $2.5\text{m}^2$ .

## Technology Development

The major technology challenge remains the mirror development, and in particular the achievement of the 5” HEW angular resolution requirement. To mitigate risk our two independent technology paths are still being actively pursued: SPO Optics (ESA) and slumped glass (NASA), plus additional work by JAXA on the hard X-ray response and multilayer coatings. A technology development program is in place to achieve the required technology readiness level for all the critical mission technologies, including the optics, by the end of the definition phase as required by Cosmic Vision. Both mirror development programs have made major progress during the study phase, meeting the necessary milestones to be consistent with this schedule. Figure 1 compares the recent progress made in the silicon pore optics angular resolution (on modular test pieces) with the equivalent advances implemented during the XMM development.



**Figure 1** Comparison of IXO Si pore optics development achievements (left) with the equivalent development activity in XMM (right)

## Program Update

Overall, the ESA and NASA studies both indicate a feasible launch date of 2021 for IXO. The NASA schedule estimate has been independently confirmed by study by the Aerospace Corporation. A launch on this timescale of course relies on funding approval, and from its inception IXO was conceived as an international collaboration, which cannot be realised by a single agency.

In the US, the decadal committee is expected to issue its reports at the end of August at the earliest, but no further information is expected before then. Over the summer, a formal proposal to JAXA will be submitted for a Mission Definition Review. This would allow a more detailed design of the various spacecraft elements that JAXA could provide, based on its heritage from previous missions.

In Europe, IXO is in competition for the Large (L-class) mission slots in Cosmic Vision. The L-class missions will undergo a down-selection expected in early 2011, with two of the three candidate missions under study entering a definition phase. The exact timetable for the L-class down-selection has not yet been finalised, but it is expected that the study report ("Yellow Book") will be due around the beginning of September. The international cooperation was among the key considerations in the submission to the decadal survey, and one possible collaboration scenario was presented at the time. In this, the cost to ESA of the European contribution to IXO is consistent with the L-class mission cost cap of €650M, but other scenarios are possible.

Success in these evaluations depends on a combination of scientific merit, technological readiness and financial and programmatic feasibility. Overall, the studies so far indicate that IXO is in excellent shape, and can compete for launch in the ~2021 time frame i.e. in ESA parlance, the L-1 launch slot.